

Product No.: 71C/7110
EPA Reg. No.: 67760-28
Product name: **NUFOS 4E** (Chlorpyrifos 480 g/l EC)

MVF/October 1996-USA

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MATERIAL SAFETY DATA SHEET

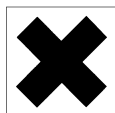
NUFOS 4E

(Chlorpyrifos 480 g/l EC)

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1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY / UNDERTAKING



Harmful



Dangerous
for the
environment

(EU pictograms)

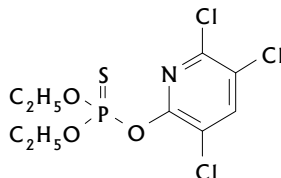
Product Name: **NUFOS 4E**
(Chlorpyrifos 480 g/l EC)

Manufacturer: **CHEMINOVA AGRO A/S**
P.O.Box 9
DK-7620 Lemvig
Denmark

2. COMPOSITION/INFORMATION ON INGREDIENTS

2.1. ACTIVE INGREDIENT:

Chemical Name	O,O-Diethyl-O-(3,5,6-trichloro-2-pyridinyl)-phosphorothioate
CAS Name	Phosphorothioic acid, O,O-diethyl-O-(3,5,6-trichloro-2-pyridinyl) ester
ISO Name	Chlorpyrifos
CAS No.	2921-88-2
Molecular Weight	350.56
Empirical Formula	C ₉ H ₁₁ Cl ₃ NO ₃ PS
Structural Formula	



Material Safety Data Sheet according to 91/155/EEC (preparations)/93/112/EEC (substances) with amendments.
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2.2. **TYPICAL CONTENT:**

Active ingredient.....	Chlorpyrifos..... (Pure active ingredient)	44.2 % by weight
Inert ingredients	Petroleum distillates, emulsifiers, etc.	55.8 % by weight

2.3. **MATERIAL USE** Insecticide.

2.4. EU Classification Xn;R20/22 N;R50/53

2.5. WHO Classification Class II: "Moderately Hazardous"

2.6. US Classification..... Toxicity Category II, signal word: Warning.

Acute oral:	Category II,
Acute dermal:	Category III,
Acute inhalation:	Category IV,
Eye irritation:	Category II,
Skin irritation:	Category II

2.7. Canada - HMIS Ratings Health: 2,
Flammability: 2,
Reactivity: 1,
Personal Protection: See 8.1.

3. HAZARDS IDENTIFICATION

In this section is described the health hazards for **Chlorpyrifos** which is the most toxic component in the product.

3.1. Health Hazards (Acute and Chronic) **Chlorpyrifos** is a dangerous poison (cholinesterase inhibitor). It rapidly enters the body on contact with all skin surfaces and eyes. Clothing contaminated with material must be removed immediately and all skin washed thoroughly. Exposed persons must receive prompt medical treatment.

Repeated exposures to cholinesterase inhibitors such as **Chlorpyrifos** may, without warning, cause increased susceptibility to doses of any cholinesterase inhibitor.

3.2. Signs and Symptoms of Exposure Headaches, nausea, vomiting, cramps, weakness, blurred vision, pin-point pupils, tightness in chest, labored breathing, nervousness, sweating, watering of eyes, drooling or frothing of mouth and nose, muscle spasms and coma.

3.3. Environmental Hazards See 12

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4. FIRST AID MEASURES

- 4.1. Emergency and First Aid Procedures Call a doctor (physician), clinic or hospital immediately. Explain that the victim has been exposed to **Chlorpyrifos** - an organophosphorus insecticide - and describe his/her condition. Move victim immediately from the area where the product is present.
- If breathing has stopped, start artificial respiration immediately and maintain until physician takes charge of victim.
- If swallowed and the exposed is conscious make him/her vomit quickly. Have the exposed drink 1 or 2 glasses of water and induce vomiting by touching the back of throat with finger (be aware that the product contains petroleum distillates). Repeat until vomit is clear. Never give anything by mouth to an unconscious person. Make the exposed lie down and keep him/her steady. Get medical attention immediately.
- In case of contact immediately flush eyes or skin with plenty of water while removing contaminated clothing and shoes. See physician immediately.
- 4.2. Note to Physician **Chlorpyrifos** is a cholinesterase inhibitor affecting the central and peripheral nervous systems and producing cardiac and respiratory depression.
- (Be aware that the product contains petroleum distillates which may pose an aspiration pneumonia hazard).
- Cholinesterase inhibition - treatment **Antidote:** Administer atropine sulphate in large doses. TWO to FOUR mg intravenously or intramuscularly as soon as cyanosis is overcome. Repeat at 5 to 10 minute intervals until signs of atropinization appear. 2-PAM chloride is a pharmacological antidote and may be administered as an adjunct to, but not a substitute for atropine, which is a symptomatic and often lifesaving antidote. DO NOT GIVE MORPHINE OR TRANQUILLIZERS.
- At first sign of pulmonary edema, the patient should be given supplemental oxygen and treated symptomatically.
- Continued absorption of **Chlorpyrifos** may occur and relapse may occur after initial improvement; VERY CLOSE SUPERVISION OF THE PATIENT IS INDICATED FOR AT LEAST 48 HOURS.

5. FIRE-FIGHTING MEASURES

- 5.1. Extinguishing Media and Procedure Dry chemical or carbon dioxide for small fires, water spray or foam for large fires.
- Use water spray to keep fire-exposed containers cool. Approach fire from upwind to avoid hazardous vapours and toxic decomposition products. Fight fire from protected location or maximum possible distance. Avoid heavy hose streams. Dike area to prevent water runoff. Firemen should wear self-containing breathing apparatus and protective clothing.
- 5.2. Hazardous Decomposition or Byproducts in a Fire The essential breakdown products are: Hydrogen chloride, ethyl sulfide, diethyl sulfide, nitrogen oxides and various chlorinated organic compounds.
- 5.3. Unusual Fire and Explosion Hazards See 10.1

6. ACCIDENTAL RELEASE MEASURES

- 6.1. Personal Protection Observe all protection and safety precautions when cleaning up spills - see 8.
- 6.2. Steps to be taken in Case of Spill **Small liquid spills** on the floor or other impervious surface should be swept up by means of an inert absorptive material such as hydrated lime, sawdust, Fuller's earth or other absorbent clays. Scoop into proper containers and dispose of in accordance with the instructions provided under Disposal (see 13). Rinse area with soda lye.
- Large liquid spills** on the floor or other impervious surface should be contained or diked and then absorbed with an inert absorptive material such as hydrated lime, sawdust, Fuller's earth or other absorbent clays. Collect the contaminated absorbent, place in a metal drum and dispose of in accordance with the instructions provided under Disposal (see 13). Rinse area with soda lye.
- Large spills that soak into the ground should be dug up, placed in metal drums and disposed of in accordance with instructions provided under Disposal (see 13).
- Chlorpyrifos** can be hydrolyzed in water by heating and adjusting the pH (alkaline). The product may also be disposed of through proper incineration.

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7. HANDLING AND STORAGE

- 7.1. Precautions to be taken in Handling See Personal protection - section 8.
- 7.2. Precautions to be taken in Storing The product is stable when when stored in coated, unopened drums at temperatures not exceeding 20-25°C.
- The product should never be heated above 55°C and also local heating above this temperature should be avoided. Protect against strong heat from sunshine or other source e.g. in case of fire.
- 7.3. Fire and Explosion Precautions .. -

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- 8.1. Respiratory Protection In case of insufficient ventilation wear a respirator approved by the local authorities.
- Protective Gloves Wear chemical resistant gloves, such as barrier laminate, butyl rubber, nitrile rubber or viton.
- Eye Protection Wear safety glasses.
- Other Protection Wear water-proof pants, coat, hat, rubber boots or rubber overshoes.
- 8.2. Work/Hygienic Practices If handled indoors, provide mechanical exhaust ventilation.
- Persons working with this product for a longer period should have frequent blood tests of their cholinesterase levels. If the cholinesterase level falls below a critical point, no further exposure should be allowed until it has been determined by means of blood tests that the cholinesterase level has returned to normal.
- Keep all unprotected persons and children away from working area.
- Before removing gloves wash them with soap and water. Always wash hands, face and arms with soap and water before smoking, eating or drinking.

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After work, take off all work clothes and shoes. Shower, using soap and water. Wear only clean clothes when leaving job. Do not wear contaminated clothing. Wash protective clothing and protective equipment with soap and water after each use. Respirator should be cleaned and filter replaced according to instructions included with respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. Physical State	Liquid.
9.2. Colour	Red.
9.3. Odour	Slightly aromatic.
9.4. Melting Point	Below 0°C.
9.5. Boiling Point	Decomposes.
9.6. Specific Gravity	1.086 g/ml at 20°C.
9.7. Vapour Pressure	1.87 x 10 ⁻⁵ mm Hg at 25°C (Chlorpyrifos), 8.15 x 10 ⁻⁵ mm Hg at 35°C (Chlorpyrifos).
9.8. Viscosity	3.6. cP at 25°C and 2.0 - 2.3 cP at 45°C.
9.9. Solubility in Water	The product is emulsifiable in water.
9.10 Solubility in organic solvents	-
9.11. Partition Coefficient n-Octanol/Water	Kow = 9100, Log Kow = 4.959 (Chlorpyrifos).
9.12. pH	5.9 in a 1% aqueous solution at 25°C.
9.13. Flash Point	66°C (151°F) (Pensky-Martens closed tester).
9.14. Autoignition Temperature	460°C.
9.15. Flammable Limits	-

10. STABILITY AND REACTIVITY

10.1. Thermal Decomposition	The product (Chlorpyrifos) will decompose rapidly when heated to temperatures above 160°C significantly increasing the risk of inducing explosion. The decomposition is dependent on time as well as temperature due to exothermic and autocatalytic reactions. The reactions involve rearrangements and polymerization releasing volatile malodorous and inflammable compounds such as diethyl sulfide.
10.2. Hazardous Decomposition or Byproducts	See 5.2.
10.3. Materials to Avoid	Strong alkalis, amines and strong oxidizing compounds. The product is corrosive to mild steel.

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11. TOXICOLOGICAL INFORMATION

- 11.1. Health Hazards See 3.1
- 11.2. Route(s) of Entry - Ingestion LD₅₀, oral, rat (M): 205 mg/kg.
 - Skin LD₅₀, dermal, rat: Greater than 4000 mg/kg.
 - Inhalation LC₅₀, inhalation, rat (M): 2.16 mg/l/4h.
- 11.3. Irritancy of Material Moderately irritant to rabbit skin. Irritant to eyes.
- 11.4. Sensitization of material Not a sensitizer in guinea pigs.
- 11.5. Carcinogenicity Oncogenicity, Mouse: No statistical differences in tumour incidence between any treated and the control groups were observed (**Chlorpyrifos**).

No carcinogenic effect were observed in rats when fed chlorpyrifos in their diets at concentrations formulated to provide 0, 0.05, 0.1, 1, or 10 mg/kgbw/day for up to two years.
- 11.6. Reproductive Effects No effects on fertility were observed in rats at any dose level tested (0, 0.1, 1.0, 5.0 mg/day, 7 days per week throughout two generations).
- 11.7. Teratogenicity Chlorpyrifos is not considered teratogenic in rats at levels up to 15 mg/kg/day (a maternally toxic level).
- 11.8. Mutagenicity No mutagenic effects observed in vivo and in vitro (**Chlorpyrifos**).

12. ECOLOGICAL INFORMATION

The product is toxic to fish and wildlife. The acute toxicity is -

- Fish	96-h LC50, Rainbow trout (<i>Salmo gairdneri</i>)	48 µg/l
- Invertebrates	48-h, EC50, Daphnids (<i>Daphnia magna</i>)	2.6 µg/l
- Birds	LD50, Bobwhite quail (<i>Colinus virginianus</i>)	83 mg/kg
	8-day dietary LC50, Bobwhite quail (<i>Colinus virginianus</i>)	423 ppm (Chlorpyrifos)
	8-day dietary LC50, Mallard Duck (<i>Anas platyrhynchos</i>)	591 ppm (Chlorpyrifos)

13. DISPOSAL CONSIDERATIONS

- 13.1. Waste Disposal Method Spill and waste disposal procedures approved by state and local authorities must be observed.

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Do not contaminate water, food or feed by storage and disposal.

- 13.2. Container Disposal Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill. Procedures approved by state and local authorities must, however, be observed.

14. TRANSPORT INFORMATION

UN CLASSIFICATION

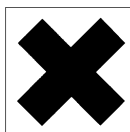
- 14.1. Name Organophosphorus Pesticide, Liquid, Toxic, N.O.S (Contains Chlorpyrifos), Marine Pollutant
 14.2. No. 3018
 Packing Group III
 14.3. Class 6.1
 14.4. Prim. Haz Toxic Substance
 14.5. Sub Risk -

REGULATORY INFORMATION

15.1 IN THE EU:

- EU Index No. Chlorpyrifos: 015-084-00-4
 EINECS No. Chlorpyrifos: 220-864-4
 Classification and Labelling:
 (according to 88/379/EEC with amendments
 (preparations)): Xn

Symbol of Danger



Harmful



Dangerous for
the
environment

Indication of Danger

Contains

Chlorpyrifos

R-Phrases

R20/22-50/53: Harmful by inhalation and if swallowed. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S-Phrases.....

S24-46: Avoid contact with skin. If swallowed, seek medical advice immediately and show this container or label.

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15.2 Threshold Limit Value OSHA PEL Australia: United Kingdom: HGV Others:
(Chlorpyrifos) (USA):
0.2 mg/m³ 0.2 mg/m³ 0.2 mg/m³ 0.2 mg/m³ -
Threshold limit values approved by the authorities must, however,
be observed.

16. OTHER INFORMATION

(Code No. KeL/7113-02/9607)

16.1. **Emergency Telephone Number:** (+45) 97835353 (Cheminova-Denmark)

16.2. IN THE US:

Emergency Medical Telephone
Number 1-800-228-5835, Ext. #153
Other Emergencies CHEMTREC toll free 1-800-424-9300
Telephone Number for Information (201) 305-6600